

ART. VIII.—*Note on Paryphanta lignaria.*

By Captain F. W. HUTTON, F.R.S.

[*Read before the Philosophical Institute of Canterbury, 20th August, 1899.*]

Plate II.

SIR WALTER BULLER has kindly allowed me to photograph a perfect shell of this species which was obtained on Mount Rochfort, near Westport, and to add to the description given in the "Transactions of the New Zealand Institute," vol. xx., p. 43. The greatest diameter is about 2 in. There are five and a half whorls in the specimen, and the angle of spire is 125°. The whole shell is of a yellowish-brown or luteous colour, the brown bands being obsolete. The first whorl is pale, the following ones are darker in colour. The umbilicus is the same as in *P. hochstetteri*. The aperture is transverse, the columella descending more than in the adult *P. hochstetteri*, but not so much as in the young of the same species. The peristome is thin, the upper margin oblique, slightly undulated near the suture.

The figures (Plate II.) are rather less than natural size; the lower one is slightly canted to get the light into the umbilicus, so that it does not show the correct outline at the base. This is seen in the upper figure. I have compared this specimen with photographs of the types of *Paryphanta gilliesii* kindly sent to the Museum by Mr. E. A. Smith, and I find that that species has a much larger umbilicus than *P. lignaria*, besides being flatter.

ART. IX.—*The Tipulidæ, or Crane-flies, of New Zealand.*

By Captain F. W. HUTTON, F.R.S.

[*Read before the Philosophical Institute of Canterbury, 1st November, 1899.*]

Plates III. and IV.

THIS paper is founded on Mr. G. V. Hudson's collection, which he kindly sent me to describe. As it raises the list of our *Tipulidæ* from nineteen to forty-four species, the collection must be considered a very good one, and I hope that I shall be found to have given a fairly good account of it. My part, however, has been rendered comparatively easy by Mr.

Skuse's papers on the Australian *Tipulidæ*, in the "Proceedings of the Linnæan Society of New South Wales" for 1889 and 1890, and by Baron Osten-Sacken's "Studies," which he was good enough to send me.

All the New Zealand species of *Tipulidæ* as yet described are endemic, while all the genera except two—*Tinemyia* and *Tanyderus*—are found in Australia, and it is probable that these two will be found there in due course. *Tanyderus* is found in Chili and Amboina; *Macromastix* in Australia and Chili; *Gynoplistia* is limited to Australia, New Guinea, and Celebes; and *Cerozodia* to Western Australia. The other twelve genera have a wide distribution.

Family TIPULIDÆ.

Legs very long and slender. The head prolonged forwards into a rostrum, which is often provided with a sharp-pointed nasus. Ocelli nearly always absent. Mesonotum generally with a V-shaped transverse suture. The basal cells of the wings elongated, almost always reaching beyond the middle of the wing; a discal cell in most of the genera. Ovipositor generally with two pairs of horny pointed valves.

KEY TO THE SUB-FAMILIES.

V-shaped suture distinct.

Auxiliary vein ends in the first longitudinal, or absent *Tipulinae*.

Auxiliary vein ends in the costa *Limnobiinae*.

V-shaped suture, indistinct or absent.. .. . *Ptychopterinae*.

Sub-family TIPULINÆ.

The tip of the auxiliary vein turns backwards and joins the first longitudinal; sometimes it is blended with the first longitudinal, and therefore apparently absent. No sub-costal cross-vein. The first longitudinal ends in the second, and is connected near its tip to the costa by a cross-vein. Last joint of the palpi long and flagelliform, generally longer than the other three taken together.

KEY TO THE NEW ZEALAND GENERA.

No discal cell *Dolichozeza*.

A discal cell.

Second posterior cell sessile *Pachyrrhina*.

Second posterior cell petiolate.

No tubercle above the antennæ *Tipula*.

A tubercle above the antennæ *Macromastix*.

Genus DOLICHOZEZA, Curtis (1825).

"Anterior branch of the second longitudinal vein entirely wanting, consequently there is no rhomboid cell. Præfurca extremely short, often almost vertical. Discal cell wanting;

the chief cross-vein situated a considerable distance before the base of the fourth posterior cell. Antennæ 13-jointed. Genitalia of the male somewhat incrassate, with long digitiform appendages" (Skuse).

Dolichopeza atropos. Plate III., fig. 1.

Tipula atropos, Hudson, Trans. N.Z. Inst., vol. xxvii., p. 295 (1895).

Uniform dark-brown, the wings tinted yellowish-brown; the stigma and veins brown. The third joint of the antennæ is elongated, and is as long as the fourth and fifth taken together. Second posterior cell rather short, petiolate; chief cross-vein more than half its length distant from the end of the fourth posterior cell. The auxiliary vein joins the first longitudinal at the origin of the second longitudinal. The first longitudinal ends free, and there is no marginal cross-vein. The third longitudinal is much bent down, and then turns slightly upwards before joining the margin of the wing. Anal angle of the wing distinct.

Male.—Length of body, 12 mm.; of wing, 15 mm.

Hab. Wellington (Hudson).

The male forceps is incrassate, but I cannot make it out clearly without destroying the unique specimen.

Genus **PACHYRHINA**, Macquart (1889).

Rostrum short and stout. Antennæ generally 13-jointed, about the length of the thorax. Second posterior cell sessile.

Pachyrhina hudsoni. Plate III., figs. 2a to 2d.

Tipula dux, Hudson, Trans. N.Z. Inst., vol. xxvii., p. 293 (1895), not of White and Kirby (1884).

In this fine species the rostrum is stout, about the length of the head, and the terminal joint of the palpi is long and flagelliform. The antennæ are 13-jointed; the first joint long and cylindrical, the second globular, the third, fourth, and fifth cylindrical, stout, decreasing in length, the rest very narrow, with long hairs; the thirteenth joint minute. Wings luteous, with a pale, irregular, transverse fascia from the tip of the first longitudinal, across the chief cross-vein, as far as the fourth longitudinal; also a pale spot on the posterior margin of the discal cell. The discal cell is large, pentagonal, receiving the posterior cross-vein at its outer posterior angle. Præfurca longer than the chief cross-vein, forming about one-half of the second longitudinal. Forceps of the male exposed, not thickened, formed by two pairs of appendages, an upper and a lower. The upper pair, or forceps proper, 2-jointed; the basal joint long and oval in shape, the

second joint small, the inner edge slightly dentate and ending in a minute, dark, horny tooth. The lower pair smaller, claw-shaped, with a free lobe on the inner side. Ovipositor long and pointed. Length, ♂ 28 mm., ♀ 38 mm.; wing, ♂ 30 mm., ♀ 31 mm.; antennæ, ♂ 3 mm., ♀ 3 mm.

Hab. Wellington (Hudson).

Although this species has a short rostrum, a sessile second posterior cell, and a long terminal joint to the palpi, it is not a true *Pachyrhina*, on account of the position of the posterior cross-vein and the long præfurca, in both of which it resembles *Tipula*. As, however, there appear to be several other species intermediate between these two genera, it will be advisable to retain ours in *Pachyrhina* until a revision is made by some one who can examine a large collection from all parts of the world.

The antennæ and male forceps appear to be peculiar, unless in the latter the lower pair of appendages are the "large foliaceous appendages" described as occurring in *Longurio*.

Genus TIPULA, Linnæus (1740).

Rostrum longer than the head, with a distinct nasus. Antennæ simple, short in both sexes. Terminal joint of the palpi long and flagelliform. Discal cell receiving the posterior cross-vein at its outer posterior angle; second posterior cell petiolate; second longitudinal vein not sinuated. Genitalia protruding in both sexes; forceps of the male moderately thickened.

The species *novaræ* and *fulva* form a section which has perhaps as much claim to generic distinction as has *Holorusia*. Also *orion*, *dux*, *clara*, and *tenera* form another group of closely allied species.

KEY TO THE SPECIES.

Third longitudinal vein sinuated.

Wings clear, with a few small spots *T. novaræ*.

Wings yellowish, with a dark spot on the chief cross-vein *T. fulva*.

Third longitudinal vein not sinuated.

Præfurca short, less than one-third of second longitudinal vein.

Greenish, no pale ring behind the eyes .. *T. viridis*.

Brown, a pale ring behind the eyes.. .. *T. obscuripennis*.

Præfurca long, nearly half of second longitudinal vein.

Costal cell dark-brown.

Wings ochraceous *T. orion*.

Wings hyaline.

Tips of the wings clear *T. dux*.

Tips of the wings fuscous *T. clara*.

Costal cell clear *T. tenera*.

Tipula novaræ.

Tipula novaræ, Schiner, Reise der "Novara," Diptera, p. 37 (1868); Cat. Dipt. of N.Z., p. 14. *Tipula senex*, White and Butler, Voy. "Erebus" and "Terror," Insects, p. 27, pl. vii., fig. 15 (1875); Cat. Dipt. of N.Z., p. 14; Kirby, Trans. Ent. Soc. of London, 1884, p. 270.

As Mr. Kirby has pointed out, the colours of the body of this insect are very variable, and the darker varieties are nearly unicolor. In both Schiner's and White's descriptions mistakes occur in describing the four spots on the wings. They are as follows: The first is at the base of the anterior basal cell; the second is on the anterior margin of the posterior basal cell, at about half its length, where a short spurious vein runs down; the third is at the origin of the second longitudinal vein; while the fourth is at the apex of the first marginal and base of the second submarginal cells. Also a brown band runs from the fourth spot along the chief cross-vein, the base of the discal cell, and the posterior cross-vein, to the tip of the fifth longitudinal vein. Schiner is also incorrect in saying that the joints of the antennæ are "totally bare," for they have the usual short hairs. The forceps in the male is not thickened. The ovipositor is long and pointed. Length, ♂ 16–18 mm., ♀ 25 mm.; of wing, ♂ 21–22 mm., ♀ 27 mm.

Hab. Throughout New Zealand.

Walker, in his "List of Diptera in the British Museum," p. 71, gives New Zealand and New South Wales as localities for this species, but the latter is probably a mistake, as Mr. Skuse does not know the insect.

In both this and the next species the venation is remarkable, in that the chief cross-vein arises at the end of the præfurca, so that the second submarginal cell has only a punctiform contact with the anterior basal cell. The third longitudinal is in a line with the præfurca, and bends upwards towards the posterior branch of the second longitudinal, and then down again to the margin.

Tipula fulva, sp. nov. Plate III., fig. 3.

Rostrum with a distinct nasus. Antennæ short, 13-jointed, simple. Body nearly uniform reddish-yellow, the thorax with yellowish longitudinal bands. Wings yellowish, getting dusky towards their tips; a fuscous spot at the bases of the second submarginal and first posterior cells, inside of which is a transparent fascia extending from the costa through the first submarginal and anterior basal cells, to the discal. Fifth posterior and axillary cells also nearly clear; seventh longitudinal vein margined with fuscous; a small dark spot at the

origin of the second longitudinal vein. Short cross-folds in the costal cell and along the hind margin of the posterior basal cell. Length, ♂ 20 mm.; wing, ♂ 22 mm. Female not known.

Hab. Nelson (Hudson).

The venation of the wing resembles that of *T. novaræ*. The præfurca is about equal in length to the third longitudinal.

Tipula viridis. Plate III., figs. 4a, 4b.

Tipula viridis, Walker, Ins. Saunders, Diptera, p. 445 (1856).

T. holochlora, Nowicki, Mem. d. Krakauer K.-K. Akad. der Wissenschaften, band 2, gedruckten Aufsatzes (1875); Cat. Dipt. of N.Z., p. 15; Hudson, Manual of N.Z. Entomology, p. 47, pl. v., figs. 1 and 1b.

Greenish luteous. Thorax testaceous above, with three longitudinal darker bands, the central of which is the shortest, and is sometimes divided into two bands. Wings hyaline, without spots; the costal cell and stigma pale-yellowish. Length, ♂ 15 mm., ♀ 22 mm.; wing, ♂ 21 mm., ♀ 28 mm.

Hab. Throughout New Zealand.

The antennæ are rather longer and slenderer than usual; the ninth to the eleventh joints being markedly narrower than those that go before them; the twelfth joint is rather thicker, forming a slight club; the thirteenth is minute. In the wing the præfurca is short, forming only about a fourth of the whole of the second longitudinal vein. The petiole of the second posterior cell is short. The forceps of the male is thickened. The ovipositor is long and pointed.

Tipula obscuripennis. Plate III., fig. 5.

Tipula obscuripennis, White and Kirby, Trans. Ent. Soc. of London, 1884, p. 271.

Male.—"Reddish-brown above, with a greyish bloom beneath. Head reddish-brown, with a white ring round the black eyes. Thorax greyish, with two contiguous reddish-brown stripes occupying the middle above; they are divided by a narrow pale line, and are slightly narrower behind than before; on each side is a darker oval spot, which is continued on to the metathorax. This and the scutellum are pale and shining, the latter edged with dusky behind. Abdomen reddish-brown above, with an obsolete dark spot in the middle of each segment; second segment almost entirely dusky. Legs tawny, with the knees and tarsi blackish. Wings hyaline, with the costal cell and the rather large oblong stigma pale-yellow; halteres blackish; a transparent space in the costal cell, and the lower part of the hinder basal cell with small perpendicular folds" (Kirby). Forceps thickened.

Female with degenerate wings, unable to fly. Ovipositor quite short and thick. The abdomen often rugose.

Length, ♂ 7–9 mm., ♀ 10 mm.; wing, ♂ 14–16 mm., ♀ 4 mm.

Hab. Auckland to Christchurch.

I give Mr. Kirby's description in full, but the colours of the thorax and abdomen vary a good deal, many specimens being unicolor. It can, however, always be recognised by the pale ring behind the eye. The antennæ are rather short and stout. The wings are slightly smoky, except a transparent mark on both sides of the stigma. The præfurca is short, forming less than a third of the second longitudinal vein; the petiole of the second posterior cell is long. The auxiliary vein is more or less blended with the first longitudinal.

The eggs are laid in the ground, and the adult insect emerges in April.

Tipula dux. Plate III., fig. 6.

Tipula dux, White and Kirby, Trans. Ent. Soc. of London, 1884, p. 270.

“Orange; head orange; antennæ, palpi, and most of the upper surface of the muzzle (which is moderately broad, obtuse, and set with short stiff bristles) blackish; base of palpi brown, a long black streak running forwards to a double point from the middle of the vertex. Thorax orange; front of prothorax and first pleural sutures black; a wide black stripe on the back of the mesothorax, ceasing before the lateral suture, and with a brown extension on each side in front; and two wide black stripes on each side, starting at about one-fourth of the length of the mesothorax, and curving towards each other, but not meeting, on the scutellum, which is wholly orange. Abdomen orange, with a black stripe on the back widened at the extremity of each segment, a black stripe on each side, and a central one (paler towards the base of the abdomen) beneath; legs black; front femora yellowish beneath. Wings hyaline, naked, iridescent, with short folds along the outer half of the upper edge of the front basal cell and along the lower edge of the hind basal cell; veins brown; costal cells and stigma yellowish-brown; first marginal and first submarginal cells clear; a triangular dusky spot extending to the inner side of the basal cross-vein; halteres yellow, with the clubs black” (Kirby). Length, ♂ 15 mm.; wings, ♂ 19–20 mm. The female is unknown.

Hab. Auckland and Wellington (Hudson).

In none of my specimens is there a dark mark on the vertex. The stigma and costal cell as far as the basal cross-vein are dark-brown; inside the basal cross-vein the costal cell is clear. The auxiliary is completely blended with the

first longitudinal vein. The præfurca is long, forming nearly one-half of the second longitudinal vein; the petiole of the second posterior cell is moderate, but variable in length; the fifth longitudinal is distinctly double. The legs are rather stout. The antennæ are 13-jointed, rather short and stout. The first joint is large and cylindrical, the second cyathiform; the others slightly oval, decreasing in length; the twelfth is swollen to form a small club, the thirteenth is minute. The forceps of the male is thickened.

Tipula orion.

Tipula orion, Hudson, Trans. N.Z. Inst., vol. xxvii., p. 294 (1895).

This species is closely related to *T. dux*, but the wings are of a decided ochraceous tint; also, there is always a fuscous elongated spot on the vertex between the eyes. The basal joint of the antennæ is orange. The tip only of the rostrum is fuscous. The pronotum is entirely orange; the mesonotum has the usual dark bands, which are sometimes fused together. The triangular spot at the basal cross-vein is less distinct than in *T. dux*. Length, ♂ 13–14 mm.; wing, ♂ 18–19 mm. Female unknown.

Hab. Mountains of Nelson, 4,000 ft. above the sea (Hudson).

Tipula clara.

Tipula clara, White and Kirby, Trans. Ent. Soc. of London, 1884, p. 271.

“Head and thorax orange-yellow; antennæ, except the long basal joint, palpi, tip of muzzle, and a spot between the eyes dusky; palpi set with short bristles. Abdomen black, with a stripe on each side, the incisions and anus yellow; coxæ yellow; legs brown, under-surfaces shading into yellowish. Wings nearly as in *T. dux*, but without longitudinal folds; the apex is clouded, and the triangular spot on the basal cross-vein is smaller and more sharply defined; halteres yellow, with black tips” (Kirby). Length, ♂ 10 mm.; wing, ♂ 16 mm. Female unknown.

Hab. Auckland and Wellington (Hudson).

The antennæ and the venation of the wings resemble those of *T. dux*, but the legs are more slender.

Tipula tenera, sp. nov.

Pale yellow-orange. Palpi, tip of the rostrum, and the antennæ (except the first joint) fuscous, as also is a narrow longitudinal line on the tip of the head between the eyes. Pronotum with some dark spots in the middle. Mesonotum black, divided by light lines at the sutures; scutellum yellow;

metanotum yellow, with two black spots near the posterior margin. Abdomen with black lateral stripes, which meet, both above and below, on the penultimate segment, so that the two last segments are altogether black. Forceps of the male thickened, hidden. Legs slender, black, the coxæ yellowish-orange. Wings hyaline, the costal cell clear; stigma brown; the lower edge of the posterior basal cell with small folds. Length, ♂ 9 mm.; wing, ♂ 12–13 mm. Female unknown.

Hab. Wellington (Hudson).

Genus MACROMASTIX, Osten-Sacken (1886).

Rostrum rather long, with a distinct nasus. Last joint of the palpi about as long as the other three taken together. Front with a tubercle above the antennæ. Antennæ of male 13-jointed, often much longer than the body, sometimes short; first joint thickened, the second short, the others almost filiform; the joints gradually increasing in length. Antennæ of female 13-jointed, not longer than the head. Abdomen rather stout and short; the last segment in the male narrower than the others; the forceps small and not protruding. Ovipositor not protruding. Tibiæ with spurs; empodia present. Venation of the wings as in *Tipula*.

This genus is the same as *Macrothorax* of Jaenicke (1867), a name which had been preoccupied in 1864.

KEY TO THE SPECIES.

Wings unspotted.

Wings colourless.

Thorax cinerous, very hairy *M. vulpina*.

Thorax yellowish, glabrous *M. pallida*.

Wings tinted.

Thorax cinerous, not very hairy *M. fucata*.

Thorax black, with yellow hairs *M. montana*.

Wings spotted.

Pale marks in basal cells connected *M. lunata*.

Pale marks in basal cells separated *M. binotata*.

Macromastix vulpina.

Megistocera vulpina, Hutton, Cat. Diptera of N.Z., p. 16 (1881). *Macromastix vulpina*, Osten-Sacken, "Studies on Tipulidæ," part i., p. 185.

This species is easily distinguished by the long yellowish-white hairs on the chest. The præfurca occupies about one-third of the whole of the second longitudinal vein. The auxiliary vein is blended with the first longitudinal. The hind margin of the posterior basal cell has a series of small cross-folds. Length, ♂, ♀ 9–10 mm.; of the wing, ♂, ♀ 15 mm.; of the antennæ, ♂ 19–20 mm., ♀ 3 mm.

Hab. Otago (F. W. H).

Macromastix fucata, sp. nov.

Head, rostrum, and bases of the antennæ yellowish-brown; occiput, palpi, and tips of the antennæ fuscous. Pronotum, scutellum, and part of the metanotum yellow. Mesonotum cinerous, the transverse suture black; four dusky bands before the suture, the middle pair not reaching the anterior margin, united both before and behind, the exterior pair shorter; pleuræ and pectus cinerous, not very hairy. Halteres fuscous. Abdomen cinerous, except the second segment. Second to sixth segments with a black dorsal mark, contracted forwards on each segment. On the second segment this mark is bordered on both sides and in front with dull-yellow. The third to the sixth segments are narrowly margined behind with yellow; the seventh and eighth segments have a parallel-sided black mark on the dorsum; the ninth segment is black. Wings tinted yellowish-brown, the costal cell yellower; stigma and veins brown. Coxæ cinerous; femora yellowish-brown except the tips, which, with the tibiæ and tarsi, are fuscous. Length, ♀ 15 mm.; wing, ♀ 18 mm.; antennæ, ♀ 3 mm. The male is unknown.

Hab. Wellington (Hudson).

Macromastix pallida, sp. nov.

Pale brownish-yellow, with faint brownish longitudinal bands on the mesonotum, and the distal halves of the fourth to the eighth abdominal segments brownish. Wings nearly colourless, the stigma and veins pale brownish-yellow. Petiole of the second posterior cell not so long as the cell. Intercalary vein bending slightly upwards, towards the anterior branch of the fourth longitudinal. Præfurca short, about one-fourth of the whole of the second longitudinal vein. Length, ♂ 14 mm.; wing, ♂ 18 mm.; antennæ, ♂ 18 mm. or 19 mm. The female is unknown.

Hab. Wellington (Hudson).

Macromastix montana, sp. nov.

Head and thorax black, with yellow hairs. Abdomen in the male reddish, with a dark dorsal band; in the female black, with the lower surface and nearly the whole of the second segment orange. Tubercle on the head rather small. Antennæ in both sexes not much longer than the head. Wings slightly smoky; uniform in colour, except the stigma, which is darker. Hind margin of the posterior basal cell with short transverse folds. Præfurca rather less than one-third of the second longitudinal vein; petiole of the second posterior cell short. Legs black, the proximal halves of the femora

orange. Length, ♂ 13–14 mm., ♀ 15–16 mm.; wing, ♂ 22–23 mm., ♀ 22 mm.; antennæ, ♂ and ♀ 3 mm.

Hab. Humboldt Mountains, Otago (Hudson).

Macromastix lunata, sp. nov.

Reddish-brown, the female paler than the male. Head between the eyes dusky. Mesonotum with four dark bands. Abdomen with a dark longitudinal dorsal band. Antennæ long in the male, short in the female; reddish at the base and gradually darkening outwards. Wings smoky, the anterior half darker than the posterior; stigma darker still. A large white lunate mark, convex backwards, in the basal cells; generally another clear space encircling the stigma. Hind margin of the posterior basal cell with short transverse folds. Præfurca forming more than one-third of the second longitudinal vein. Legs dark, the proximal halves of the femora and the coxæ reddish. Length, ♂ 9–10 mm., ♀ 10–11 mm.; wing, ♂ 15–16 mm., ♀ 17–18 mm.; antennæ, ♂ 25 mm., ♀ 3 mm.

Hab. Wellington (Hudson).

Macromastix binotata, sp. nov. Plate III., fig. 7.

Brownish-yellow, except the mesonotum, which is cinereous and with four brown bands, all of which are united on the fore border and taper backwards. The palpi and the dorsi of the third to the eighth abdominal segments dusky. Halteres yellowish, the tips paler. Wings dusky, with darker clouds at the apex of the first submarginal cell and along the anterior edge of the fifth longitudinal vein. A clear fascia runs from the base of the first submarginal cell across the basal cells; another lies near the basal cross-vein. Petiole of the second posterior cell short, less than one-half of the length of the cell. Intercalary vein sinuated, and bent backwards near its tip towards the fifth longitudinal. Præfurca between one-half and one-third of the whole length of the second longitudinal vein. Length, ♂ 12 mm.; wing, ♂ 17 mm.; antennæ, ♂ 9 mm. The female is unknown.

Hab. Wellington (Hudson).

Sub-family LIMNOBINÆ.

The tip of the auxiliary vein turns forward and ends in the costa. A subcostal cross-vein nearly always present. Last joint of the palpi short, not longer than the two preceding joints.

KEY TO THE NEW ZEALAND GENERA.

Tibiæ without spurs; eyes approximated.			
One submarginal cell.			
No marginal cross-vein			<i>Rhamphidia.</i>
A marginal cross-vein.			
Auxiliary ends near the origin of second longitudinal.			
Rostrum shorter than the head and thorax			<i>Dicranomyia.</i>
Rostrum longer than the head and thorax			<i>Geranomyia.</i>
Auxiliary ends much beyond the origin of the second longitudinal.			
Sixth and seventh longitudinals connected by a cross-vein			<i>Trochobola.</i>
Sixth and seventh longitudinals not connected			<i>Limnobia.</i>
Two submarginal cells.			
Præfurca ends in the first submarginal cell			<i>Molophilus.</i>
Prefurca ends in the second submarginal cell.			
Three last joints of the antennæ abruptly smaller			<i>Trimicra.</i>
Three last joints of the antennæ like the others			<i>Gnophomyia.</i>
Tibiæ with apical spurs; eyes widely separated; two submarginal cells.			
Antennæ simple.			
Rostrum not elongated			<i>Limnophila.</i>
Rostrum much elongated			<i>Tinemyia.</i>
Antennæ uni-pectinate, ♂, or serrate, ♀.			
Antennæ 16- to 22-jointed			<i>Gynophstia.</i>
Antennæ 32- to 39-jointed			<i>Cerozodia.</i>

Genus DICRANOMYIA, Stephens (1829).

“One submarginal and four posterior cells; marginal cross-vein at the tip of the first longitudinal; tip of the auxiliary vein generally opposite or before the origin of the second longitudinal, seldom beyond it. Antennæ 14-jointed. Rostrum not longer than the head. Tibiæ without spurs. Empodia indistinct or none. Male forceps formed by two movable, soft, fleshy, subreniform lobes, and a horny style under them” (Osten-Sacken).

A. Wings with spots.

Dicranomyia vicarians.

Limnobia vicarians, Schiner, Reise der “Novara,” Diptera, p. 46 (1868); Cat. Dipt. of N.Z., p. 17. *Dicranomyia vicarians*, Mik, Verh. z.-b. Wien, xxxi., p. 196, pl. xiii., fig. 1 (1881). *Limnobia chorica*, White, MSS.

Rust-red, with yellow legs. Wings pale-yellow, with a small spot at the origin of the second longitudinal and a larger one on the edge. Length, 5-6 mm.

Hab. Auckland. Unknown to me.

Dicranomyia fasciata, sp. nov.

Greyish-brown; coxæ and lower surface lighter. Wings hyaline; a large fuscous spot near the middle of the anterior basal cell, just inside the origin of the second longitudinal vein, another in the centre of the marginal cell, and a small spot at the origin of the third longitudinal vein. Inner and outer margins of the discal cell and the posterior cross-vein bordered with fuscous. The auxiliary vein ends slightly outside the origin of the second longitudinal; the posterior cross-vein lies inside the base of the discal cell. Rostrum shorter than the head. Joints of the flagellum submoniliform. Length, ♀ 7 mm.; wing, ♀ 9 mm. The male is unknown.

Hab. Christchurch (F. W. H.).

B. Wings without spots.

Dicranomyia monilicornis, sp. nov. Plate III., fig. 8.

Dicranomyia monilicornis, Osten-Sacken, MSS.

Yellowish-brown; rostrum, coxæ, and lower surface of body lighter; antennæ and palpi darker. Wings unspotted, slightly fuscous; the costa yellowish-brown; veins fuscous. Rostrum about the length of the head in the female, shorter in the male. Flagellum of the antennæ submoniliform in both sexes. Legs hairy. The auxiliary vein ends some distance inside the origin of the second longitudinal; posterior cross-vein in a line with the base of the discal cell. Length, ♂ 6–7 mm., ♀ 6–7 mm.; wing, ♂ 8–9 mm., ♀ 9 mm.

Hab. Christchurch (F. W. H.).

Dicranomyia nigrescens, sp. nov.

Dark-fuscous, almost black, the ovipositor reddish. Wings unspotted, dark-fuscous. Rostrum about as long as the head in the female. Joints of the flagellum of the antennæ oval. Auxiliary vein ending slightly beyond the origin of the second longitudinal. Posterior cross-vein in a line with the base of the discal cell. Length, ♀ 8 mm.; wing, ♀ 11 mm. The male is unknown.

Hab. Wellington (Hudson).

Genus GERANOMYIA, Haliday (1833).

“One submarginal cell; four posterior cells; a discal cell. Antennæ 14-jointed, submoniliform, joints not pedicelled. Rostrum and proboscis prolonged, longer than the head and thorax taken together; the short palpi inserted about their middle. Feet slender; tibiæ without spurs at the tip; empodia indistinct or none; ungues with teeth on the under-side. The forceps of the male like that of *Dicranomyia*” (Osten-Sacken).

Geranomyia annulipes, sp. nov. Plate III., figs. 9a, 9b.

Brownish-yellow; pronotum, a central band on the mesonotum, and metanotum fuscous. Proboscis about as long as the thorax without the head; palpi rather long, 4-jointed, situated at the middle of the proboscis. Antennæ 14-jointed; joints of the flagellum pyriform. Halteres with fuscous tips. The second to the seventh abdominal segments dark-brown above, with pale-yellowish hind margins. Legs brownish-yellow, with fuscous articulations and a fuscous ring near the tip of each femur. Wings tinted yellowish, with two large brown spots, the first at the origin of the second longitudinal vein, the second on the marginal cross-vein; also two small spots—one on the basal cross-vein, the other at the commencement of the submarginal cell. The chief cross-vein, the posterior cross-vein, and both inner and outer edges of the discal cell are bordered with fuscous. The tip of the auxiliary vein ends a little beyond the origin of the second longitudinal. Præfurca bent down and angled, with a small stump at the angle. Length, ♂ 6 mm.; wing, ♂ 8 mm. Female unknown.

Hab. Wellington (Hudson).

I place this species in *Geranomyia* on account of its long proboscis, but the antennæ do not agree with the definition of the genus. The posterior cross-vein lies inside the base of the discal cell.

Genus **LIMNOBIA**, Meigen (1818).

“One submarginal cell; four posterior cells; a discal cell. The marginal cross-vein is sometimes at the tip of the first longitudinal vein, but often at some distance anterior to this tip, crossing the stigma; the tip of the auxiliary vein is usually far beyond the origin of the præfurca. Antennæ 14- (often apparently 15-) jointed. Legs comparatively strong; tibiæ without spurs at the tip; empodia indistinct or none; ungues with several teeth on the under-side, giving them a pectinate appearance. The forceps of the male consists of two horny movable hooks, and a horny style under them” (Osten-Sacken).

Limnobia fumipennis.

Tipula (Cylindromata) fumipennis, White, MS. *Limnobia fumipennis*, Butler, *Cistula Entomologica*, vol. i., p. 355 (1875).

“Head and thorax dark-brown; abdomen dark-brown, with a whitish pale line at the base in the middle; legs black; wings blackish, the veins at the end margined with deeper black than the general surface of the wings” (White).

Hab. New Zealand.

Limnobia conveniens.

Limnobia conveniens, Walker, List of Diptera in the Brit. Mus., p. 57 (1848); Cat. N.Z. Diptera, p. 17.

A small pale species with unspotted wings which is unknown to me. The fifth longitudinal vein is said, "beyond half its length, to send forth a branch which is forked."

Genus **TROCHOBOLA**, Osten-Sacken (1868).

"One submarginal cell; four posterior cells; a discal cell; the tip of the auxiliary is far beyond the origin of the second longitudinal vein; the marginal cross-vein is some distance anterior to the tip of the first longitudinal vein; a supernumerary cross-vein connects the sixth and seventh longitudinal veins. Antennæ 14-jointed. Legs slender; tibiæ without spurs at the tip; empodia indistinct; ungues with teeth on the under-side" (Osten-Sacken).

KEY TO THE SPECIES.

Wings with ocellated spots .. .. .	..	..	..	..	<i>T. variegata.</i>
Spots on the wings not ocellated.					
Discal cell regular .. .. .	..	..	..	..	<i>T. ampla.</i>
Discal cell irregular .. .. .	..	..	..	..	<i>T. picta.</i>

Trochobola variegata, sp. nov.

Yellowish-brown; mesonotum with three narrow brown stripes; scutellum and centre of the metanotum dark-brown. Legs dark-brown; knees and a ring near the distal ends of the femora pale. Wings yellowish, with irregular, brown, ocellated markings, one round the origin of the second longitudinal, another round the marginal cross-vein, another at the outer edge of the discal cell, another round the supernumerary cross-vein, another at the tip of the sixth longitudinal, besides several irregular markings. First longitudinal vein arcuated near the marginal cross-vein, and joining the costa almost at right angles to it. Posterior cross-vein in a line with the inner margin of the discal cell. Joints of the flagellum of the antennæ oval. Length, ♂ 10 mm.; wing, ♂ 14 mm. The female is unknown.

Hab. Wellington (Hudson).

Trochobola ampla. Plate III., fig. 10.

Tipula fumipennis, Hudson, Man. of N.Z. Entomology, p. 48, pl. v., fig. 2; no description.

Brown; the legs yellowish, with a brown band near the tip of each femur. Thorax with some indistinct pale stripes. Wings pale yellowish-brown; a dark spot at the base of the anterior basal cell; a brown transverse fascia from the costa, through the origin of the second longitudinal, to the supernumerary cross-vein. Apex of wing beyond the basal cells

brown; a clear round spot in the base of the submarginal cell, and a clear space occupying most of the first posterior and discal cells. First longitudinal vein arcuated, but joining the costa obliquely. Posterior cross-vein in a line with the inner margin of the discal cell. Joints of the flagellum of the antennæ slightly cyathiform in the male, oval in the female. Length, ♂ 14 mm., ♀ 11 mm.; wing, ♂ 20 mm., ♀ 14 mm.

Hab. Wellington (Hudson).

I have not adopted Mr. Hudson's name for this species, because the wings are not smoky, and because we have already in New Zealand a *Limnobia funipennis* which might cause confusion.

Trochobola picta, sp. nov. Plate III., fig. 11.

Yellowish-brown, darker below; mesonotum pale, with a narrow dark central line and a broader one on each side, passing from the head to above the wings; the tip of the scutellum and the metanotum dark-brown. Legs pale, with a dark ring near the distal end of each femur. Wings transparent, with numerous dark-brown spots; three near the costa. Of these the first is situated at the base of the anterior basal cell, the second at the origin of the second longitudinal vein, and the third round the stigmatic area; the latter is the largest of the three, and extends along the costa from inside the tip of the auxiliary vein to the tip of the first longitudinal; it also extends backwards to the base of the first posterior cell. Near the costa it contains some pale spots. The rest of the wing has numerous small brown spots, and larger ones at the apices of the first and fourth posterior cells, as well as in the anal and auxiliary cells. Posterior cross-vein in a line with the inner edge of the discal cell. Joints of the flagellum of the antennæ cyathiform. Length, ♂ 10 mm.; wing, ♂ 12 mm. The female is unknown.

Hab. Wellington (Hudson).

In both my specimens the discal cell is irregular, the cross-vein at the base of the second posterior cell being placed outside its usual position, so as to make that cell about half the length of the third posterior.

Genus RHAMPHIDIA, Meigen (1830).

“One submarginal cell; four posterior cells; a discal cell; no marginal cross-vein. The tip of the auxiliary vein is at some distance beyond the origin of the second longitudinal; the subcostal cross-vein is close to its tip. Rostrum elongated, but shorter than the thorax; last joint of the palpi elongated. Antennæ 16-jointed. Tibiæ without spurs at the tip; empodia indistinct; ungues smooth. The forceps of the male very like that of *Elephantomyia*” (Osten-Sacken).

Rhamphidia levis, sp. nov. Plate IV., figs. 12a, 12b.

General colour dark-brown; the mesonotum pale-cinereous, with three broad fuscous bands, the central one going the whole length, the outer pair terminating before the anterior border. Halteres clear, the tips fuscous. Legs fuscous, except the coxæ and bases of the femora, which are yellow. Ovipositor yellowish-brown. Wings tinted with fuscous. Antennæ very short, 12-jointed, the first joint short, the second large and cyathiform, the third stout, oval; those of the rest of the flagellum short and oval. Rostrum longer than the head and thorax together, straight; the palpi small, placed at the end of the rostrum. The auxiliary vein reaches the costa a little beyond the origin of the second longitudinal. No marginal cross-vein. Præfurca rather less than the distance from the origin of the third longitudinal to the chief cross-vein. Posterior cross-vein in a line with the inner margin of the discal cell. Length, ♀ 7 mm.; wing, ♀ $7\frac{1}{2}$ mm.; rostrum, ♀ 5 mm. The male is unknown.

Hab. Wellington (Hudson).

Although the species here described has the characteristic venation of *Rhamphidia*, the antennæ and palpi differ considerably, and the rostrum is longer than the head and thorax together; but as I have only seen one specimen, which I could not dissect, I place it in *Rhamphidia* for the present.

Genus **MOLOPHILUS**, Curtis (1833).

“Two submarginal cells; four posterior cells; discal cell open. Wings pubescent along the veins only. Second longitudinal usually originates at a very acute angle some distance before the middle of the anterior margin; subcostal cross-vein at a considerable distance from the tip of the auxiliary vein; the præfurca ends in the first submarginal cell, which is longer than the second. The inner end of the discal cell (or, rather, as it is always open, of the second posterior cell), as well as the great cross-vein, not in one line with the small cross-vein, but much nearer to the root of the wing. Antennæ 16-jointed. Tibiæ without spurs at the tip; ungues smooth on the under-side; empodia distinct” (Osten-Sacken).

Baron Osten-Sacken says that he has in his collection species from New Zealand.

Genus **TRIMICRA**, Osten-Sacken (1861).

“Two submarginal cells; four posterior cells; a discal cell; the second longitudinal vein originates at a more or less acute angle before the middle of the length of the wing, and a considerable distance (more than the breadth of the wing) before the tip of the auxiliary vein; seventh longitudinal

vein straight. Wings and their veins glabrous. Antennæ 16-jointed, the three last joints of the flagellum abruptly smaller. Tibiæ without spurs at the tip; unguis small, smooth on the under-side, inserted under a projection of the last tarsal joint; empodia small but distinct. Forceps of the male with large, incrassated basal pieces, and a double, claw-shaped, horny appendage fastened to them on each side; ovipositor with flattened, curved, pointed upper valves and short lower ones" (Osten-Sacken).

Baron Osten-Sacken says that he has in his collection a species from New Zealand.

Genus GNOPHOMYIA, Osten-Sacken (1859).

"Two submarginal cells; four posterior cells; a discal cell; the second longitudinal vein originates somewhat before the middle of the anterior margin, a considerable distance anterior to the tip of the auxiliary vein; præfurca very slightly arcuated at the basis, nearly straight; subcostal cross-vein at a small or moderate distance (hardly exceeding the length of the great cross-vein) from the tip of the auxiliary vein; seventh longitudinal vein nearly straight. Wings glabrous. Antennæ 16-jointed. Tibiæ without spurs at the tip; tarsi with distinct empodia. The forceps of the male consists of two comparatively short basal pieces and a pair of claw-shaped, horny appendages; a second pair of horny appendages, below the first, is shorter and stouter" (Osten-Sacken).

Gnophomyia rufa. Plate IV., fig. 13.

Tipula rufa, Hudson, Trans. N.Z. Inst., vol. xxvii, p. 294 (1895).

Length, ♂ 27 mm.; wing, ♂ 21 mm. The female is unknown.

Hab. Wellington and Nelson (Hudson).

This fine species answers well to Osten-Sacken's definition of *Gnophomyia*. The antennæ are 16-jointed, the joints of the flagellum oval. The rostrum is shorter than the head. The eyes are contiguous. The empodia are large. There are no tibial spurs. The origin of the second longitudinal is very oblique. The first submarginal cell is nearly as long as the second. The seventh longitudinal vein is straight for some distance, and then turns sharply backwards, joining the margin at a high angle; the posterior cross-vein enters the discal cell at about one-third of its length from the inner margin. The wings are glabrous, and orange in colour. There is a dark oblique streak from the tip of the first longitudinal, through the fork of the second longitudinal, into the

anterior basal cell. Another dark streak borders the seventh longitudinal vein.

Genus *LIMNOPHILA*, Macquart (1834).

“Two submarginal cells; usually five, seldom four, posterior cells; discal cell closed; subcostal cross-vein posterior to the origin of the second longitudinal vein, usually closely approximated to the tip of the auxiliary vein. Wings glabrous. Eyes glabrous. Antennæ 16-jointed. Tibiæ with spurs at the tip; empodia distinct; ungues smooth” (Osten-Sacken).

Of the species here described, *L. delicatula*, *L. marshalli*, *L. umbrosa*, and *L. geographica* have short tibial spurs, not much longer than the breadth of the tibia, which are not easily seen among the hairs, and they may, perhaps, form a distinct genus. *L. crassipes* also departs from the true *Limnophila* in having no empodia, so that only two of our species are really typical. In all, however, the eyes are separated, showing that they are rightly placed near *Limnophila*. All the known New Zealand species have five posterior cells.

KEY TO THE SPECIES.

Posterior cross-vein arising near the inner end of the discal cell.

Wings ochraceous *L. sinistra*.

Wings colourless *L. delicatula*.

Posterior cross-vein arising in the middle of the discal cell.

Subcostal cross-vein inside the tip of the auxiliary.

Spots at costal cross-vein and tip of auxiliary united *L. umbrosa*.

Spots at costal cross-vein and tip of auxiliary separate *L. marshalli*.

Subcostal cross-vein close to the tip of the auxiliary.

Wings with ocellated spots *L. argus*.

Wings with simple spots *L. crassipes*.

A. Tibial spurs long.

a. *Empodia* present.

Limnophila sinistra. Plate IV., fig. 14.

Tipula obscuripennis, Hudson, Trans. N.Z. Inst., vol. xxvii., p. 294 (1895); not *Limnophila obscuripennis*, Skuse (1890).

Yellowish-brown; head and rostrum, sides of the thorax, and a stripe on each side of the abdomen fuscous. Joints of the antennæ dark-brown at the base. Fore and middle femora with three fuscous bands; hind femora with the proximal half, the knee, and a narrow band inside it fuscous. Wings pale-yellowish, dotted with brown. A short brown band at the origin of the second longitudinal vein; another, much longer, from the tip of the auxiliary along the chief and posterior cross-veins. Others at the apices of the discal and

fifth posterior cells. Smaller brown spots at the base of the second posterior cell, and at the tips of the hinder branch of the fourth and the intercalary veins. The second longitudinal, at its origin, bends almost at a right angle. The posterior cross-vein is sinuated, and joins the inner margin of the discal cell. The subcostal cross-vein is at a short distance behind the tip of the auxiliary but outside the chief cross-vein. Length, ♂ 14 mm., ♀ 12 mm.; wing, ♂ 15 mm., ♀ 14 mm.

Hab. Wellington (Hudson).

***Limnophila argus*, sp. nov.**

Pale-brown, marked with fuscous. Head, mesonotum, margins of the metanotum, and a band on each side of the thorax from head, under the wing, to the metanotum, fuscous. Scutellum pale. First abdominal segment pale; second and third dark, with a pale central mark; the anterior half of the others dark, while the posterior half is pale, with a wedge-shaped dark dorsal mark, which has two yellow spots near its base. Femora pale-brown, with two dark rings near the tip; tibiae and tarsi dark-brown. Wings hyaline, with ocellated brown spots on the origin and on the fork of the second longitudinal, at the marginal cross-vein, at the fork of the anterior branch of the fourth longitudinal, at the tip of the seventh longitudinal, and another inside it. Also simple rings at the tips of most of the longitudinal veins and on the posterior cross-vein; brown bands on the chief cross-vein, and at the outer margin of the discal cell. The subcostal cross-vein is close to the tip of the auxiliary. The first submarginal cell is three-fourths of the length of the second. The posterior cross-vein enters the discal cell near the middle. Length, ♂ 14 mm., ♀ 19 mm.; wing, ♂, ♀ 15 mm.

Hab. Wellington (Hudson).

β. Empodia absent.

***Limnophila crassipes*, sp. nov.** Plate IV., fig. 15.

Pale yellowish-brown; mesonotum with indistinct brown bands. The tips of the femora and a ring a little inside them dark-brown; tarsi dark-brown. Wings dirty-yellow, the veins brown; pale-brown spots at the origin of the second longitudinal, at the tip of the auxiliary, at the origin of the third longitudinal, in the middle of the first submarginal cell, at the base of the posterior basal cell, and on the posterior cross-vein. The subcostal cross-vein is near the tip of the auxiliary. The first submarginal cell is about three-quarters of the length of the second. The posterior cross-vein enters the discal cell near the middle. The tibial spurs are long, and the ungues are large, but there are no empodia. Length, ♀ 12 mm.; wing, ♀ 19 mm. The male is unknown.

Hab. Wellington (Hudson).

This is a robust species, with thickish legs and no empodia. It has five posterior cells. The rostrum is thick, nearly vertical, and about as long as the head.

B. Tibial spurs short.

***Linnophila delicatula*, sp. nov.**

Uniform brown, the abdominal segments with paler posterior margins. Halteres fuscous. Wings clear, without spots or stigma; the veins fuscous. Five posterior cells. Subcostal cross-vein close to the tip of the auxiliary. The præfurca forms more than a half of the second longitudinal. The posterior cross-vein joins the discal cell at a distance from its inner margin which is less than one-fourth of its length. Length, ♀ 12½ mm.; wing, ♀ 13 mm. The male is unknown.

Hab. Wellington (Hudson).

The tibial spurs and empodia are short but distinct. The legs are particularly long and slender.

***Linnophila marshalli*, sp. nov.** Plate IV., fig. 16.

Dark-brown; coxæ and femora pale yellowish-brown, the latter with fuscous tips and a fuscous band near the tip; tibiæ and tarsi fuscous. First and second joints of the antennæ pale yellowish-brown, the flagellum fuscous. Halteres yellowish, with fuscous tips. Wings pale-yellowish, with brown spots at the origin of the second longitudinal, at the subcostal cross-vein, at the tips of the auxiliary and first longitudinal, on the chief cross-vein, at the outer margin of the discal cell, at the base of the second posterior cell, on the posterior cross-vein; two in the posterior basal cell, one in the axillary cell, and others at the tips of all the longitudinal veins. Subcostal cross-vein far from the tip of the auxiliary and in a line with the chief cross-vein. First submarginal cell not much more than half the length of the second. Posterior cross-vein entering the discal cell near the middle. Seventh longitudinal vein sinuated. Length, ♀ 10 mm.; wing, ♀ 11 mm. The male is unknown.

Hab. Wellington (Hudson).

I have named this species in honour of Mr. P. Marshall, the author of three excellent papers on New Zealand *Diptera* in the "Transactions of the New Zealand Institute," vol. xxviii. The tibial spurs are small, and lie close under the metatarsi; the empodia are distinct. The eyes are separated. The antennæ are 16-jointed; those of the flagellum are cylindrical, except the two last, which are oval.

***Limnophila umbrosa*, sp. nov.**

Pale-brown, marked with darker brown. Sides of the pronotum, a central band on the rest of the thorax, and a band on each side of the abdomen, dark-brown. Femora pale-brown, with two dark bands on the distal half; tibiæ and tarsi dark-brown. Wings subhyaline, with pale-brown markings. A round spot near the basal cross-vein; a large semi-circular fascia from the origin of the second longitudinal, through the anterior basal cell and the chief cross-vein, to the subcostal cross-vein, and spreading out to the tip of the auxiliary vein. Spots at the apices of the second subcostal and submarginal cells, at the base of the second posterior and apex of the discal cells, on the posterior cross-vein, and at the tips of all the longitudinal veins. Subcostal cross-vein far from the tip of the auxiliary, and in a line with the chief cross-vein. The posterior cross-vein enters the discal cell about the middle. Length, ♀ 9 mm.; wing, ♀ 12 mm. The male is unknown.

Hab. Wellington (Hudson).

In this species, like the last, the tibial spurs are short, and lie under the metatarsi; the empodia are distinct. The first nine joints of the flagellum are cylindrical, the last five are oval.

***Limnophila geographica*, sp. nov.**

Thorax brown, the pronotum and a band on each side of the mesonotum yellow; scutellum with two round fuscous spots. Palpi and antennæ fuscous, except the base of the flagellum, which is yellow; rostrum yellow. Abdomen pale-brown, with a dark-brown stripe on each side, the two last segments dark-brown. Coxæ very pale-yellow; femora brownish-yellow, with the proximal ends and two broad bands on the distal half fuscous; tibiæ yellowish-brown; tarsi fuscous. Wings colourless, except the costal cell, which is yellowish, and several fuscous spots and fasciæ. Two large spots at the basal cross-vein and at the origin of the second longitudinal, between which there are two small spots in the costal cell. A large dark mark extends on the costa from the tip of the auxiliary to that of the anterior branch of the second longitudinal, going inwards to the base of the discal and apex of the anterior basal cells. A dark curved fascia from the centre of the first posterior cell, through the apex of the discal, and reaching the margin of the wing between the tips of the fifth and seventh longitudinal veins. Small spots at the tips of the longitudinal veins, and another near the anal angle of the wing. The subcostal cross-vein is close to the tip of the auxiliary. The first submarginal cell is more than

three-fourths the length of the second. There is a stump at the angle of the præfurca. The posterior cross-vein enters the discal cell at about three-quarters of its length from the hind margin. Length, ♂ 12 mm.; wing, ♂ 13 mm. The female is unknown.

Hab. Wellington (Hudson).

In this species, like the two last, the tibial spines are short, and pass below the metatarsus. The empodia are distinct. The antennæ are 16-jointed; the joints of the flagellum cylindrical.

Genus TINEMYIA, gen. nov.

Two submarginal cells; five posterior cells; a discal cell; subcostal cross-vein beyond the origin of the second longitudinal. Wings and eyes glabrous. Antennæ 16-jointed. Rostrum longer than the head and thorax together, the palpi near the tip. Tibiæ with short spurs. Empodia indistinct or none. Ungues smooth.

Notwithstanding its short tibial spurs, which are less than the breadth of the tibia, the venation of the wings shows that this genus belongs to the *Limnophilinæ*. I have only seen a single female specimen, and so can give no account of the forceps of the male.

Tinemyia margaritifera, sp. nov. Plate IV., figs. 17a, 17b.

Brown, the tips of the first six joints of the flagellum of the antennæ and the whole of the last joint pale. The knee-joints are also pale. Antennæ long; the first joint short and stout, the second cyathiform, those of the flagellum cylindrical, except the last, which is oval and broader than the others. Rostrum twice as long as the head and thorax taken together; the palpi short, 3-jointed. Halteres very long, brown. The ovipositor pale at the tip. Wings brown, with numerous small pale-yellow spots and lines. About nine spots, either circular or semicircular, in the costal cell; a larger one crossing the second subcostal and first submarginal cells; another in the second marginal. Others in the middle portion of the wing, chiefly as short straight or curved cross-streaks. Four round spots in the anal cell. Veins fuscous. Subcostal cross-vein close to the tip of the auxiliary. First submarginal cell about three-fourths the length of the second. Posterior cross-vein entering the discal cell at about one-third of its length from the inner margin. Length, ♀ 15 mm.; wing, ♀ 14 mm.; antenna, ♀ 4 mm.; rostrum, ♀ 6 mm. The male is unknown.

Hab. Wellington (Hudson).

Genus GYNOPLISTIA, Westwood (1835).

Two submarginal cells; five (rarely four) posterior cells; discal cell generally closed; auxiliary vein reaching the costa nearly opposite the base of the second submarginal cell. First submarginal cell with a short petiole. Seventh longitudinal vein distinctly sinuated. Wings and eyes glabrous. Antennæ 15- to 22-jointed; most of the flagellar joints unipectinate in both sexes, or serrate in the female. Tibiæ spurred. Empodia distinct. Ungues smooth. Male forceps like that of *Limnophila*, usually with one horny claw-shaped appendage. Ovipositor long and pointed.

Baron Osten-Sacken says that he has in his collection a species of *Gynoplistia* from New Zealand, in which the wings in both sexes are rudimentary.

KEY TO THE SPECIES.

Abdomen not metallic.

Tips of the femora fuscous *G. subfasciata*.
 Tips of the femora subfuscous *G. wakefieldi*.

Abdomen metallic.

A dark spot at the origin of the præfurca.
 Tips of the wings fuscous *G. cuprea*.
 Tips of the wings clear *G. formosa*.
 No dark spot at the origin of the præfurca *G. fulgens*.

Gynoplistia subfasciata.

Gynoplistia subfasciata, Walker, List of Diptera in Brit. Mus., p. 74 (1848). *Cloniophora subfasciata*, Schiner, Reise der "Novara," Diptera, p. 40; Cat. Dipt. of N.Z., p. 16; Hudson, Man. of N.Z. Entomology, p. 50, pl. v., figs. 3, 3a.

Brown, the thorax with four hoary stripes. Femora with a pale tawny band near the tip. Wings slightly tawny, with a brown spot at the origin of the second longitudinal vein, and a brown fascia from between the tips of the auxiliary and first longitudinal, through the chief cross-vein, to the inner margin of the discal cell. Outer margin of the discal cell and the posterior cross-vein also brownish. Another brown spot about the middle of the sixth longitudinal. The antennæ are 15-jointed, the third to the twelfth being unipectinate in the male. They are branched in both sexes. Length, ♂ 16 mm., ♀ 20 mm.; wing, ♂ 13 mm., ♀ 14 mm.

Hab. Throughout New Zealand.

Schiner's genus *Cloniophora*, made for this species, is not allowed by Osten-Sacken.

Gynoplistia wakefieldi.

Cloniophora wakefieldi, Westwood, Trans. Ent. Soc. of London, 1881, p. 372, pl. 18, fig. 5.

Cinerous, the apex of the abdomen subcastaneous. An-

tennæ black, 16-jointed; ♂ with 3 to 13 branched, ♀ with 4 to 11 serrated. Rostrum short. Thorax with a small obscure spot on each side, and four blackish stripes on the dorsum. Wings limpid, with fuscous spots; a short oblique fascia from the tip of the first longitudinal to the base of the discal cell; a row of four to six spots in the posterior basal cell. Legs reddish; femora with a pale ring before the apex. Length, ♂ 10 mm., ♀ 16 mm. Expanse of the wings, ♂ 20 mm., ♀ 22 mm. (Abbreviated from Westwood.)

In two specimens in Mr. Hudson's collection the brown bands are quite as well marked as in *G. subfasciata*, but the legs are paler, and the femora are only subfuscous at the tip, so that the pale band is not so distinct. In the female the posterior basal cell has no spots, although they are present in the male. The antennæ of the male are 18-jointed, with 3 to 15 branched, and the branches are much longer than in *subfasciata*, and much longer than in Westwood's figure. Length, ♂ 14 mm., ♀ 17 mm., wing, ♂ 12 mm., ♀ 13 mm.

Hab. New Zealand (D. Wakefield); Wellington (Hudson).

I doubt much whether this species can be kept distinct from *G. subfasciata*; evidently the antennæ and the markings of the wings are variable, and we have only size and colour of the legs to trust to.

Gynoplistia cuprea.

Gynoplistia cuprea, Hudson, MSS. Plate IV., fig. 18.

Metallic copper-yellow, with purple reflections. Antennæ dark-brown, in the male 20-jointed, the third to the sixteenth branched. A large patch on each side of the thorax with pale-yellowish hairs. Halteres yellow. Femora pale yellowish-brown. Wings ochraceous, darker in the female, with brown spots at the origins of the second and third longitudinal veins. Tips of the wings brown. Length, ♂ 11–11½ mm., ♀ 16 mm.; wing, ♂ 11–12 mm., ♀ 15 mm.

Hab. Wellington (Hudson), Canterbury (F.W.H.).

Gynoplistia formosa, sp. nov.

Abdomen metallic steel-blue, with purple reflections. Head and antennæ dark-brown. Thorax dark-bronze. Legs dark-brown, the femora (except the tips) and a distal ring on the hind tibiæ yellow. Halteres yellow. Wings faintly tinged with yellow; a large dark spot at the origin of the second longitudinal vein, and a still larger one from the costa through the bases of the second submarginal and first posterior cells to the discal, which is clear, except the inner and outer margins. A lighter spot in the upper margin of the axillary cell, about two-thirds from the base, and touching the sixth longitudinal vein. The antennæ in the male are 22-jointed, of

which 3 to 17 are branched; the last joint is small. Length, ♂ 12 mm.; wing, ♂ 11 mm. The female is unknown.

Hab. Wellington (Hudson).

***Gynoplistia fulgens*, sp. nov.** Plate IV., fig. 19.

Abdomen metallic steel-blue, with purple reflections. Head and antennæ dark-brown. Thorax black, shining. Halteres yellow. Legs blackish-brown, the proximal portions of the femora yellowish-brown. Wings clear, except at their bases, where they are slightly tinged with yellow; a rather pale-brown spot at the apex of the marginal cell, extending across the base of the second submarginal. Only a minute spot at the origin of the second longitudinal vein. Discal cell open. Antennæ in the male 20-jointed, of which 3 to 15 are branched. Length, ♂ 13 mm.; wing, ♂ 12 mm. The female is unknown.

Hab. Wellington (Hudson).

Genus *CEROZODIA*, Westwood (1835).

“Antennæ 32- to 39-jointed, all but the first two and the last with a long branch. Rostrum not longer than the head; palpi rather long. Thorax small; abdomen narrow, of equal breadth, very slightly broader at the forceps, which is formed as in *Gynoplistia*. Legs rather stout; tibiæ with spurs; empodia present. Venation of wings as in *Gynoplistia*, except that the subcostal cross-vein is almost obsolete, so that the auxiliary vein appears to end in the first longitudinal; first submarginal cell rather long, its proximal end but little distad of the proximal end of the second submarginal; the second posterior cell with a long petiole; the great cross-vein near the middle of the discal cell” (Osten-Sacken).

***Cerozodia plumosa*.** Plate IV., fig. 20.

Cerozodia plumosa, Osten-Sacken, Berliner Entomol. Zeitschrift, 1887, p. 213.

“*Male*.—General colour reddish-brown, without any distinct thoracic stripes; a narrow black stripe on each side of the abdomen, along the suture. Antennæ yellowish-red, the branches brown. On the wings the subcostal cell and the stigma are infuscated; a large pale-brown cloud between the stigma and the discal cell; a smaller one at the origin of the præfurca; yellowish-brown clouds along the veins. Antennæ with 39 joints. Length, 25–26 mm.” (Osten-Sacken).

Hab. New Zealand (Osten-Sacken); Lake Wakatipu (Hudson).

The female is unknown. In Mr. Hudson's specimen the wing measures 23 mm.

Sub-family PTYCHOPTERINÆ.

V-shaped suture of the mesonotum indistinct. Structure of the ovipositor various.

Genus TANYDERUS, Philippi (1865).

Head placed at the end of a long cylindrical neck. The rostrum longer than the head; palpi 4-jointed, the last joint shorter than the penultimate. Eyes pubescent in the female, glabrous in the male; contiguous in both sexes, no ocelli. Antennæ 18-jointed; the first joint short and cyathiform, the second globular, those of the flagellum cylindrical, the last less than half the length of the penultimate. Thorax with tuberosities over the wings, but the sutures are not connected across the dorsum. Wings with hairs on the veins; one marginal cell, five submarginal cells, and five posterior cells. Discal cell closed. Basal cells less than half the length of the wing. Subcostal cross-vein near the tip of the auxiliary. A posterior intercalary vein. Seventh longitudinal vein absent, represented by a short fold. Tibiæ with long spurs at their tips. Empodia absent. Ungues smooth. The forceps in the male is large, simple, 3-jointed; the last joint blunt, without any teeth or horny claw. No ovipositor, but a pair of anal styles.

In this genus there is a discal cell; the anterior branch of the second longitudinal vein is forked, and the lower branch of the fork is connected by a cross-vein with the posterior branch. This posterior branch of the second is also connected by a cross-vein with the third longitudinal, thus making five submarginal cells. The origin of the third longitudinal is a little beyond the first fork of the second. The anterior branch of the fourth longitudinal is not branched, but the fourth posterior cell is divided into two by a posterior intercalary vein, thus making five posterior cells. The length of the discal cell is about four times its breadth. The posterior cross-vein is very oblique. The sixth longitudinal vein is present. The abdomen is narrow and cylindrical, with, apparently, seven segments in the male and eight in the female.

Tanyderus annuliferus, sp. nov. Plate IV., figs. 21a-21e.

Brownish-yellow, the joints of the legs and tarsi dark-brown. Head dark-brown. Mesonotum with three dark-brown bands, the pleuræ dark-brown. Tips of the halteres dark-brown. Wings nearly hyaline, with brown markings; all the longitudinal veins with hairs in both sexes. The markings on the wings consist chiefly of three brown fasciæ containing white spots, one at the base of the wing, another

through the apices of the basal cells, and a third, which is Y-shaped, through the apex of the discal cell. There are also spots on the hind margin of the wing between these fasciæ, and brown rings at the tips of most of the longitudinal veins. Length, ♂ 13 mm., ♀ 18 mm.; wing, ♂ 31 mm., ♀ 34 mm.; antennæ, ♂, ♀ 3 mm.; hind femur, ♂, ♀ 9 mm.; fore femur, ♂ 7 mm., ♀ 8 mm.

Hab. Wellington (Hudson).

The hind tibia and hind tarsus are each of the same length as the hind femur; but the fore tarsus is longer than the fore femur, and longer even than the hind tarsus. The posterior cross-vein arises at the inner angle of the discal cell, so that the base of the fourth posterior cell is pointed.

Tanyderus forcipatus. Plate IV., fig. 22.

Tanyderus forcipatus, Osten-Sacken, Verh. z.-b. Wien, xxix., p. 520 (1879).

Reddish-brown. Head and neck dark-brown. Thorax cinerous, the centre of the mesonotum dark-brown, divided by a pale longitudinal line. Halteres dark-brown. Abdomen brown, with a row of cinerous spots on each side; the anal styles orange. Coxæ, femora, and hind tibiæ reddish-brown; all the joints fuscous. Wings white, with brown markings, the costal cell yellowish, the veins dark-brown. The auxiliary, the first longitudinal, and the anterior branch of the second longitudinal alone have hairs. The markings on the wings are two round spots on the costa, one of which, at the origin of the second longitudinal, is encircled by a broad band which passes through the apices of the basal cells and through the anal cell to the base of the wing; the other is at the apex of the auxiliary vein, and outside it there is a broad oblique fascia through the base of the first submarginal and apex of the discal cells to the tip of the sixth longitudinal, but is interrupted along the posterior intercalary vein. Tips of the wings and a spot at the end of the posterior branch of the fourth longitudinal and one on the posterior margin of the axillary cell brown. Length, ♀ 15 mm.; wing, ♀ 15 mm.; hind femur, ♀ 8 mm.; fore femur, 8 mm.

Hab. Wellington (Hudson); Otago (F. W. H.).

The legs are more robust than in the last species. Neither of the hind tarsi are perfect in my specimen. The posterior intercalary vein arises from the posterior cross-vein a short distance below its junction with the fourth longitudinal, so that the fourth posterior cell has a flat base.

APPENDIX.

The following new species, from the Auckland Islands, have been described by Professor Josef Mik, of Vienna, in the *Verhandlungen der zoologisch-botanischen Gesellschaft in Wien*, vol. xxxi., pp. 195–206 (1881):—

Dicranomyia insularis.

♂. Cinereo-fusca, abdomine fasciis apicalibus transversis obscurioribus, segmentorum incisuris ipsis pallidioribus; alis infunatis, stigmatе fusco, venis longitudinalibus conspicue pilosis; apice venæ auxiliariis basi venæ longitudinalis secundæ opposito; venula transversa inter venam auxiliarem et longitudinalem primam inconspicua, ab apice venæ auxiliariis satis remota. Forcipis maris articulis terminalibus permagnis, in latere interiore in rostrum corneum bisetosum productis. Long. corp. 6 mm., long. alar. 8 mm.

Dicranomyia kronei.

♂. Tota fusca, femoribus ad basin et forcipe dilutioribus; alis infuscatis, immaculatis, stigmatе pallido, costa intra venam auxiliarem et tertiam longitudinalem valde incrassata; vena auxiliari ultra basin venæ longitudinalis secundæ excurrente; venula transversa inter auxiliarem et longitudinalem venam primam obsoleta, ab apice venæ auxiliariis parum remota et origini venæ longitudinalis secundæ opposita; venula transversa cellulam discoidalem a cellula basali anteriori separante subrecta. Long. corp. 6 mm., long. alar., 8 mm.

Trichocera antipodum.

♂, ♀. Cinereo-fuscana, genitalibus pedibusque dilutioribus; alis pallide infuscatis, immaculatis, vena transversa ordinaria cellulæ discoidalis subtrigonæ basin attingente; ramis furcæ, cellulam discoidalem egredientis, multo longioribus quam illius furcæ pedicellus; segmento venæ longitudinalis quintæ ultimo triplo longiore quam vena transversa posterior. Femine ovipositore naviculiforme. Long. corp. 4 mm., long. alar. 5 mm.

Limnophila bryobia.

♂. Nigra, halteribus testaceis, clava ad apicem nigra; alis latis, infumatis, stigmatе dilute nigro-fusco, cellulis posterioribus quatuor. Long. corp. 9 mm., long. alar. 10 mm., latitudo alarum, 3·3 mm. (ab venæ auxiliariis apice usque ad apicem venæ longitudinalis sextæ).

EXPLANATION OF PLATES III. AND IV.

PLATE III.

- Fig. 1. *Dolichozepea atropos*, wing.
 Fig. 2. *Pachyrhina hudsoni*, *a*, wing; *b*, antenna; *c*, male forceps from above; *d*, male forceps from below.
 Fig. 3. *Tipula fulva*, wing.
 Fig. 4. *Tipula viridis*, *a*, wing; *b*, antenna.
 Fig. 5. *Tipula obscuripennis*, wing.
 Fig. 6. *Tipula dux*, wing.
 Fig. 7. *Macromastix binotata*, wing.
 Fig. 8. *Dicranomyia monilicornis*, wing.
 Fig. 9. *Geranomyia annulipes*, *a*, wing; *b*, rostrum.
 Fig. 10. *Trochobola ampla*, wing.
 Fig. 11. *Trochobola picta*, wing.

PLATE IV.

- Fig. 12. *Rhamphidia levis*, *a*, wing; *b*, antenna.
 Fig. 13. *Gnophomyia rufa*, wing.
 Fig. 14. *Limnophila sinistra*, wing.
 Fig. 15. *Limnophila crassipes*, wing.
 Fig. 16. *Limnophila marshalli*, wing.
 Fig. 17. *Tinemyia margaritifera*, *a*, wing; *b*, tip of rostrum.
 Fig. 18. *Gynoplistia cuprea*, wing.
 Fig. 19. *Gynoplistia fulgens*, wing.
 Fig. 20. *Cerozodia plumosa*, wing.
 Fig. 21. *Tanyderus annuliferus*, *a*, head and thorax; *b*, head, side view; *c*, antenna; *d*, anal styles of female; *e*, forceps of male.
 Fig. 22. *Tanyderus forcipatus*, wing.

ART. X.—On Hereditary Knowledge.

By RICHARD HENRY.

Communicated by Sir James Hector.

[Read before the Wellington Philosophical Society, 11th July, 1899.]

I REMEMBER reading about the young swallows taking their flight from England when they had been only a few days on the wing; and, when we know nothing to the contrary, we are likely to assume that their parents led them away and taught them the geography of the country they were going to. But I have seen young "shining cuckoos" at Te Anau as late as April, apparently alone and quite happy, though they had a thousand-mile flight before them immediately, if they wished to survive; and no one to show them the way, for it is probable that a young cuckoo never sees its mother except by accident.

As far as our knowledge goes, the cuckoos leave their eggs and young entirely to foster-parents, who are not likely to teach